



Local Hazard Mitigation Plan Annex Unincorporated Contra Costa County

Introduction

Contra Costa County "County" is the seventh most populous county in California, with a citizenry of 1,029,377 based on Official State Estimates provided by the County Community Development Department. The County is located in the area known as the East Bay, connecting the San Francisco peninsula and the Central Valley. Last year, the County's budget was \$2.1 Billion. The County employs approximately 8,000 people across 30 departments. The County provides unincorporated area, local, and contract police and fire services, and operates two county airports and one of only eight county hospitals in the state.

The Planning Process

The process of preparing the Multi-Jurisdictional Local Government Hazard Mitigation Plan ("Plan") was familiar to the County. The County has a Safety Element to its General Plan, last updated in 2005 (Section 10), that includes a discussion of fire, earthquake, flooding, landslide, hazardous materials, and water supply hazards. The Safety Element specifically addresses disaster planning and the provision of public protection services. In addition, the County routinely enforces the requirements of the California Environmental Quality Act (CEQA), which, since 1988, has required mitigation for identified natural hazards. The County's efforts have focused on building on these pre-existing programs and identifying gaps that may lead to disaster vulnerabilities in order to work on ways to address these risks through mitigation.

Much of this preparation work was fed into the planning process for the Plan. The County participated in various ABAG workshops and meetings, including the general "kick-off" meeting and a meeting on residential damage and potential housing mitigation strategies. In addition, the County has provided written and oral comments on the Plan. Finally, the County provided information on facilities that are viewed by ABAG as "critical."

Key County staff met on several occasions to identify and prioritize mitigation strategies appropriate for the County. Meeting participants included staff from the County Administrator's Office, Public Works Department, Community Development Department, General Services Department, Office of the Sheriff, Public Works Department, Health Services Department, County Fire Agencies, County Counsel, Operational Area Council and the Emergency Policy Committee. The County provided the opportunity for the public to comment on draft mitigation strategies at the Board of Supervisors meeting on April 17, 2007. The Board of Supervisors approved adoption of resolution 2007/213

adopting the plan, as adapted by this Annex on April 17, 2007. The mitigation strategies have become a part of the Contra Costa County Operation Area Emergency Operations Plan (EOP).

Hazard and Risk Assessment

The ABAG multi-jurisdictional Local Hazard Mitigation Plan, to which this is an Annex, lists nine hazards that impact the Bay Area, five related to earthquakes (faulting, shaking, earthquake-induced landslides, liquefaction, and tsunamis) and four related to weather (flooding, landslides, wildfire and drought). These hazards also impact the County and its communities.

Surface faulting and associated earthquakes and ground failure are a major hazard in the County. There are several active faults that are located within the County. The Hayward Fault zone runs through the western portion of the County, from Kensington to Richmond. The Calaveras Fault runs through the south-central portion of the County, from Alamo to San Ramon. The Concord Fault runs through part of Concord and Pacheco, and the Clayton-Marsh Creek-Greenville Fault runs from Clayton at its north end to near Livermore. These slip-strike earthquake faults and the Diablo Thrust Fault near Danville are all considered capable of significantly destructive earthquakes and many lesser related faults are present in the area that cross critical infrastructure such as water, natural gas, and petroleum product pipelines, roads, highways, railroads and the BART System.

When homes and businesses are destroyed by an earthquake, the functioning of the entire county is affected. Emergency responders will need to provide life-saving services. Local hospitals will need to treat the injuries of residents and the workers. Temporary shelters will need to be created to provide for up to 160,000 residents across the region. All of these problems will be exacerbated by the fact that people with specific support needs (special populations such as the elderly, mobility impaired, hearing impaired and sight impaired) will be affected more than the regular population, expanding the need for local supportive services.

Numerous petroleum and chemical production facilities operate in the County. Hazardous materials are produced in the County and then transported via the industrial corridor (Highway 4), which begins in the City of Richmond and ends in the City of Oakley. One major petroleum manufacturer is located on top of the Hayward Fault, and another is located over the Concord Fault. The types of failures which cause hazardous materials releases during earthquakes include building structure failures, dislodging of asbestos, underground pipeline breaks due to soil movement and above-ground pipeline breaks due to breaks in short connector pipes that result from differential movement between pipes and structures or impacts from other structures or equipment.

As our metropolitan areas grow, more people live and work near industrial facilities with hazardous materials on site. Hazardous material releases occur in smaller earthquakes of magnitude 5 or 6. However, there is dramatically higher incidence of hazardous material releases in larger earthquakes and earthquakes in urban areas, and such releases affect a much larger area. The 1989 Loma Prieta earthquake caused hazardous material spills from southern Monterey County to Napa County.

Flooding during the rainy season is another major hazard in the County. The 100-year flood plain contains 12,820 acres and an additional 4,100 acres is located in other flood prone areas. There are 46 repetitive loss properties with claims totaling \$1,575,996 in the flood-prone areas of the County, according to information at <http://quake.abag.ca.gov/mitigation/pickflood.html>.

The Delta has a fragile levee system that dates back to the 1850s. These levees are a vital part of the Delta eco-system, which protects the quality of the water delivered to two-thirds of the State of California. Based on research conducted by scientists at the U.S. Geological Survey, a sea level rise of 20 to 80 centimeters over the next century will affect the shoreline of the San Francisco Bay, San Pablo Bay and the Sacramento San Joaquin Delta, and increase the risk of levee failure¹. While most potentially inundated areas are intertidal, other areas are not, particularly those areas along the Bay shoreline and in the inner and outer Delta areas currently protected by levees. These areas currently consist of farmland and residential developments. Key bridges and aqueduct supports, airport, businesses, and port facilities are also at risk of levee failure.

Wildfires are a continuing threat to residential areas of the County. Especially vulnerable are the East Bay Hills in Lamorinda (which includes Lafayette, Orinda, and Moraga). During the past 50 years, the Bay Area has experienced wildfire disasters in 1961, 1962, 1964, 1965, 1970, 1981, 1985, 1988, and 1991. A worst-case scenario event could affect more than 4600 parcels in the County. The Contra Costa County Fire Protection District Wildland/Urban Interface (WUI) would be affected, along with adjacent WUI communities not under the District's jurisdiction. Long-term effects of such a disaster would include a disrupted water supply, blocked roadways and bridges, disruption of a major portion of the state and federal economy, and severely limited utility service.

ABAG has provided numerous highly detailed hazard maps which can be viewed at the following website at <http://quake.abag.ca.gov/mitigation/>.

Information on the 25 disasters declared in Contra Costa County between 1950 and 2006 is at <http://quake.abag.ca.gov/mitigation/disaster-history.html>.

¹ Knowles, N., 2006. "projecting Inundation Due to Sea Level Rise in the San Francisco Bay and Delta" presented at the Third Annual Climate Change Research Conference, September 2006, Sacramento, California.

The County examined the hazard exposure of the 184,867 total urban acres of the County based on the information on ABAG's website at <http://quake.abag.ca.gov/mitigation/pickdbh2.html> and determined the following:

- ◆ Earthquake faulting: The Hayward Fault Zone runs through the western portion of the county, from Kensington to Richmond. The Calaveras Fault runs in the south-central portion of the county, from Alamo to San Ramon. The Concord Fault runs through part of Concord and Pacheco, and the Clayton-Marsh Creek-Greenville Fault runs from Clayton at its north end to near Livermore. A total of 3,491 urban acres are located in the Alquist-Priolo Earthquake Fault Zone, as mapped by the California Geological Survey.
- ◆ Earthquake shaking: 170,918 acres are in the highest two categories of shaking potential, in large part because of the number of faults in the County and the amount of unconsolidated soil in the Delta region of the County.
- ◆ Earthquake-induced landslides: The California Geological Survey has not completed mapping of this hazard in the County. However, the hazard is expected to be similar to that for other types of landslides (as stated below).
- ◆ Earthquake liquefaction: 58,685 acres are in areas of moderate, high, or very high liquefaction susceptibility.
- ◆ Tsunami: While tsunamis may be a hazard in the County, mapping of the inundation area has not yet been completed. However, if one assumes that a 42-foot tsunami enters the San Francisco Bay through the Golden Gate, it could be as high as 21 feet when it reaches the Oakland-Berkeley area of neighboring Alameda County. Based on this assumption the tsunami height would be about 10 feet high by the time it reached Richmond, located in the western part of the County. At the north end of the Bay, the height is expected to be only ten percent of its height at the Golden Gate, so those communities on Carquinez Strait on the northern edge of the County would be minimally impacted.
- ◆ Flooding: 14,214 acres are in the 100-year flood plain, while an additional 4,511 acres are in other flood-prone areas.
- ◆ Dam inundation: 18,234 acres are subject to dam inundation.
- ◆ Other types of landslides- 20,062 acres are in areas of existing landslides.
- ◆ Wildfires: 37,721 acres are subject to high, very high or extreme wildfire threat (because of the urban nature of the County). An additional 118,509 acres are in wildland-urban interface threat areas.
- ◆ Drought: All 184,867 urban acres are subject to drought. In addition, there are 126,338 acres of farmland in the County that would be directly impacted by a drought. The Agriculture and Food sector in Contra Costa consists of the following: \$19.5 million bedding plant industry, \$14.4 million sweet corn industry, \$11.3 million cattle and calves industry, \$7.9 million grapes industry, \$4.3 million vegetables, \$3.8 million rangeland, \$3 million tomatoes, \$2.3 million field corn, \$2.3 million hay-alfalfa, and \$1.9 million walnuts.

The County also examined the hazard exposure of infrastructure based on the information on ABAG's website at <http://quake.abag.ca.gov/mitigation/pickdbh2.html>. and reached the following determination as to the 5,030 miles of roadway in the County:

- ◆ Earthquake Faulting: The Hayward Fault Zone runs through the western portion of the county, from Kensington to Richmond. The Calaveras Fault runs in the south-central portion of the county, from Alamo to San Ramon. The Concord Fault runs through part of Concord and Pacheco, and the Clayton-Marsh Creek-Greenville Fault runs from Clayton at its north end to near Livermore. Only 98 miles of roadway are located in the Alquist-Priolo Earthquake Fault Zone, but this hazard can impact numerous roads and highways. For example, an earthquake on the Hayward Fault would result in 113 road closures due to surface fault rupture in this County alone. For comparison, an earthquake on the Calaveras Fault would result in 29 road closures due to surface fault rupture in the County.
- ◆ Earthquake shaking: 2,185 miles of roadway are in the highest two categories of shaking potential. Earthquake shaking also would significantly impact the 18 of the 30 miles of Bay Area Rapid Transit (BART) tracks that run from Bay Point in east county to the County's border with Alameda County near the Caldecott Tunnel, and from Richmond to the County's border with Alameda County south of El Cerrito. Both of these lines continue to San Francisco and are a major commute corridor for County residents.
- ◆ Earthquake-induced landslides: the California Geological Survey has not completed mapping of this hazard in the County, so its impact on roadways is unknown. However, the hazard is expected to be similar to that of other types of landslides (as stated below).
- ◆ Earthquake liquefaction: 1,479 miles of roadway are in areas of moderate, high or very high liquefaction susceptibility.
- ◆ Tsunami: As discussed above, tsunamis may be a hazard in the County; however, mapping of the inundation area has not yet been completed. It is therefore uncertain how many miles of roadway could be affected by a tsunami.
- ◆ Flooding: 485 miles of roadway are in the 100-year flood plain, while an additional 141 miles are in other flood-prone areas.
- ◆ Dam Inundation: 546 miles of roadway are in areas subject to dam inundation.
- ◆ Landslides: 450 miles of roadway are in areas of existing landslides.
- ◆ Wildfires: 866 miles of roadway are subject to high, very high or extreme wildfire threat; 2,946 miles of roads are in wildland-urban interface threat areas.
- ◆ Drought: Drought does not directly impact roadways.

Finally, the County examined the hazard exposure of critical health care facilities, schools, and county-owned buildings based on the information on ABAG's website at <http://quake.abag.ca.gov/mitigation/pickcrit.html>, and determined the following:

- ◆ Earthquake Faulting: The Hayward Fault zone runs through the western portion of the county, from Kensington to Richmond. The Calaveras Fault runs in the south-central portion of the county, from Alamo to San Ramon. The Concord Fault runs through part of Concord and Pacheco, and the Clayton-Marsh Creek-Greenville Fault runs from Clayton at its north end to near Livermore. Seven critical health care facilities, two schools and seven other critical facilities are located in the Alquist-Priolo Earthquake Fault Zone. However, no County-owned critical facilities are located in this zone.
- ◆ Earthquake shaking: A total of sixty-one critical health care facilities, 168 schools and 194 other critical facilities are located in the highest two categories of shaking potential, including three of the six County-owned critical facilities.
- ◆ Earthquake induced landslides: Because the California Geological Survey has not completed mapping of this hazard in the County, the impact of this hazard on critical health care facilities, schools and County-owned buildings is unknown. However, the hazard is expected to be similar to that of other types of landslides (as stated below).
- ◆ Earthquake liquefaction: A total of thirty-eight critical health care facilities, 122 schools and 217 other critical facilities are located in areas of moderate, high or very high liquefaction susceptibility, including four of the six county-owned critical facilities.
- ◆ Tsunami: Because mapping of tsunamis inundation areas has not been completed, the potential impact of a tsunami on critical care facilities, schools and County-owned buildings is unknown.
- ◆ Flooding: Four critical health care facilities, eight schools and 21 other critical facilities are located in the 100-year flood plain or in other flood-prone areas (including one County-owned critical facility), while three critical health care facilities, six schools and 16 other critical facilities are located in other areas of concern (but including no County-owned facilities).
- ◆ Dam Inundation: Twenty-one critical health care facilities, 46 schools and 67 other critical facilities are located in an area subject to dam inundation. However, no County-owned critical facilities are in these areas.
- ◆ Landslides: Two critical health care facilities, nine schools and eight other critical facilities are located in areas of existing landslides. However, no County-owned critical facilities are in these areas.
- ◆ Wildfires: Eight schools, and 19 other critical facilities are located in areas of high, very high, or extreme wildfire threat (including one County-owned critical facility), but no critical health care facilities are located in these areas. Forty-six critical health care facilities, 182 schools and 234 other critical

facilities are located in wildland-urban interface threat areas (including 2 County-owned facilities).

- ◆ Drought: Drought will affect County buildings directly. Contra Costa County works with special districts to operate a water-supply distribution system to County residents.

The County plans to work with ABAG during 2007 to improve the risk assessment information being compiled by ABAG by providing information on unreinforced masonry buildings and soft-story apartments located in the County.

Drought, though a potential problem in the County, is not fully assessed. The County will work with ABAG and various water supply agencies on this issue.

The County plans to work with ABAG to develop specific information about the kind and level of damage to buildings, infrastructure, and critical facilities which might result from any of the hazards previously noted.

As these impacts are not fully developed, the County has reviewed the hazards identified and ranked the hazards based on past disaster and expected future impacts. The conclusion is that earthquakes (particularly shaking, faulting, and liquefaction), flooding, wildfire and landslides (including unstable earth) pose a significant risk for potential loss.

Mitigation Activities and Priorities

As participants in the ABAG multi-jurisdictional planning process, County staff helped in the development and review of the comprehensive list of mitigation strategies in the overall multi-jurisdictional plan. The list was discussed at a meeting of the County Emergency Policy Review Board on May 10, 2005. At the meeting, all of the mitigation strategies were reviewed. The tentative decision on priority was made based on a variety of criteria, not simply on an economic cost-benefit analysis. These criteria include being technically and administratively feasible, politically acceptable, socially appropriate, legal, economically sound and not harmful to the environment or our heritage.

Over time, we are committed to developing better hazard and risk information to use in making those trade-offs. We are not trying to create a disaster-proof region, but a disaster-resistant one. Several of the strategies are existing County programs.

The Plan Maintenance and Update Process

The Sheriff's Office of Emergency Services will ensure that *monitoring* of this Annex will occur. The major disasters affecting our community, legal changes, notices from ABAG as the lead agency in this process and other triggers will be used. Finally, the Annex will be a discussion item on the agenda of the meetings of the Emergency Policy Board at least once a year in April. At this meeting, the members will focus on *evaluating* the Plan Annex in light of technological and political changes during the past year or other significant events. This group will be responsible for determining if the Plan Annex should be updated.

The County is committed to reviewing and *updating* this Plan Annex at least once every five years, as required by the Disaster Mitigation Act of 2000. The County Emergency Services Manager will contact ABAG four years after the Plan is approved to ensure that ABAG intends to undertake the Plan update process. If so, the County again plans to participate in the multi-jurisdictional plan. If ABAG is unwilling or unable to act as the lead agency in the multi-jurisdictional effort, other agencies will be contacted, including other County Offices of Emergency Services. Counties will then work together to identify another regional forum for developing a multi-jurisdictional plan.

The public through a collaborative government outreach program will continue to be involved whenever the Plan is updated, and as appropriate during the monitoring and evaluation process. Prior to adoption of updates, the County will provide the opportunity for the public to comment on the updates. A public notice will be posted prior to the meeting to announce the comment period and meeting logistics.